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CENTRAL INTELLIGENCE AGENCY
WASHINGTON, D.C. 20505

15 September 1975

MEMORANDUM FOR: The Director of Central Intelligence

SUBJECT : MILITARY THOUGHT (USSR): The Actual Requirement for
and Supplying of Troops with Conventional Ammunition
in Present-Day Operations

1. The enclosed Intelligence Information Special Report is part of a series now in preparation based on the SECRET USSR Ministry of Defense publication Collection of Articles of the Journal 'Military Thought'. This article develops the position that ammunition expenditure norms used in exercises are not applicable to present-day operations, and that mobile reserves of conventional ammunition in the troops are insufficient. Ammunition requirements should take into account changes in the organization of troops, the employment of conventional and nuclear weapons, and the nature of present-day combat actions. The author provides charts to illustrate his recommended methodology for calculating conventional ammunition requirements. This article appeared in Issue No. 3 (76) for 1965.

2. Because the source of this report is extremely sensitive, this document should be handled on a strict need-to-know basis within recipient agencies. For ease of reference, reports from this publication have been assigned

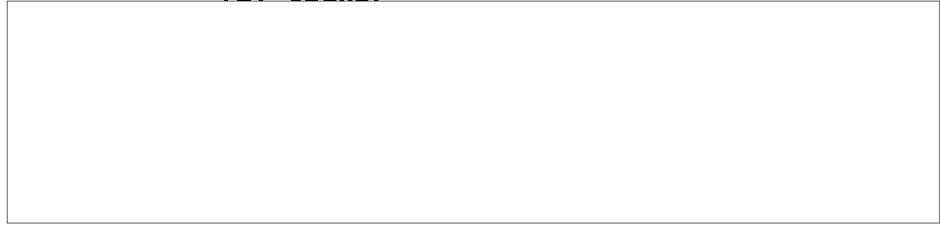
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William E. Nelson
Deputy Director for Operations

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Intelligence Information Special Report

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COUNTRY USSR

DATE OF
INFO. Late 1965

DATE 15 September 1975

SUBJECT

MILITARY THOUGHT (USSR): The Actual Requirement for and
Supplying of Troops with Conventional
Ammunition in Present-Day Operations

SOURCE Documentary

Summary:

The following report is a translation from Russian of an article which appeared in Issue No. 3 (76) for 1965 of the SECRET USSR Ministry of Defense publication Collection of Articles of the Journal 'Military Thought'. The author of this article is Colonel Ye. Yefimov. This article develops the position that ammunition expenditure norms used in exercises are not applicable to present-day operations, and that mobile reserves of conventional ammunition in the troops are insufficient. Ammunition requirements should take into account changes in the organization of troops, the employment of conventional and nuclear weapons, and the nature of present-day combat actions. The author provides charts to illustrate his recommended methodology for calculating conventional ammunition requirements.

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End of Summary

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Comment:

The SECRET version of Military Thought was published three times annually and was distributed down to the level of division commander. It reportedly ceased publication at the end of 1970.

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The Actual Requirement for and Supplying of
Troops with Conventional Ammunition in Present-
Day Operations
by
Colonel Ye. Yefimov

The emergence of nuclear weapons has necessitated fundamental changes in the organization and comprehensive support of operations. The nature of the majority of these changes has been studied in sufficient depth, and appropriate practical conclusions and recommendations have been recorded in official documents and manuals.

However, there are still many problems that have not in fact been solved, even though they are extremely important. Thus, the requirement of the troops for conventional ammunition has so far been poorly studied. It would be difficult to affirm that the existing levels of mobile reserves of ammunition, its disposition, and the organization of its delivery fully meet the requirements of conducting a battle or an operation. In addition, at the present time, when the need has arisen for working out the conduct of operations without the employment of nuclear weapons, everything that pertains to supplying the troops with conventional ammunition urgently requires a well-grounded solution.

Unfortunately, in recent years almost nothing has been written in the periodical press concerning the requirement for and the supplying of troops with conventional ammunition, and during the majority of exercises these matters are decided in outline form only, and at times they are completely omitted.

During the preparation and conduct of exercises, the entire attention of those who should have determined who needed ammunition, the quantity and types required, where it should be available, and how it should be delivered were usually busy organizing the employment of nuclear weapons, directing troop combat actions, and supplying the troops with missiles and fuel. As a result, we have no theoretically-grounded methodology of calculation for determining the ammunition requirements of the troops or even approximate norms for their expenditure in a battle or operation.

During exercises and war games, the participants are guided by the norms for expenditure of ammunition set forth in the operational directive or the combat instructions. Consequently, these norms are determined by

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the director of the exercise on the basis of materials worked out by the directing staff.

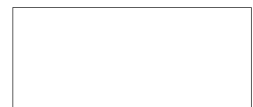
When the conduct of exercises and war games is being planned, the requirements of the troops for ammunition for tanks and small arms should be determined by the operations personnel, since it is they who plan the tank and infantry battle. However, in fact they are not concerned with this. Most often the officers of the missile and artillery armament service handle the requirements for tank and infantry ammunition on the basis of the experience of past exercises. It is clear that in doing so they do not give adequate consideration to the particular features of the exercise being prepared or to the gradual changes that are constantly taking place in the organization of the troops, in their weapons, and in the forms of combat actions.

In all exercises the artillerymen determine the ammunition to be issued for the artillery and the mortars, and frequently the experience of past exercises is substituted for a specific calculation. When the calculation is based on the specific situation and the tasks to be performed by the troops, the figures arrived at significantly exceed the mobile reserves of the large units and the delivery capabilities. When it comes to the organization of deliveries, the officers of the rear services take part in the calculations; their contribution most often amounts to an analysis of the capabilities to meet the calculated ammunition requirements with existing norms for mobile reserves and organic delivery means.

If preparations are being made for a regimental (division) exercise, a way out of the situation that has developed is found by calling on a large amount of transport from the rear services subunits and the division (army) transport units.

When preparing army and front exercises, it is necessary to proceed from actual transport capabilities and authorized reserves of ammunition. The organs that plan deliveries to the troops as a rule contend they are incapable of providing the quantity of ammunition specified by the artillerymen, and the latter are forced to make "concessions". In the majority of cases, this is the way in which norms for issuing ammunition are derived when exercises are worked out.

The commanders and staffs participating have only to distribute the allocated quantity of ammunition by tasks and large units (formations). This work is performed in an incredible hurry, since the operations personnel and workers of the rear services are allotted one to 1.5 days to



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plan the operation. The staff of the rear services immediately calls for information on the distribution of ammunition, since without it, it cannot begin planning deliveries. It is obvious, however, that until at least an outline of the plan of the operation has been made, a well-grounded plan for ammunition distribution cannot be furnished. Thus, the distribution of conventional ammunition is performed in a hurry and on a superficial basis, and sometimes with serious errors.

During a war game or exercise, the dynamics of the situation are played out in accordance with the decision and the plan for carrying out the exercise. Sometimes participants are "punished" for errors in the employment of nuclear weapons, in supplying troops with fuel, etc. But so far no one has been "punished" for errors in the distribution and organization of delivery of conventional ammunition.

This may be explained partly by the fact that in exercises no one actually calculates the necessary expenditure of conventional ammunition, and the abrupt operational transitions (skachki) made during an exercise often make such a calculation impossible.

For example, toward the end of the first or second day of an operation, the expenditure of artillery ammunition in the divisions of the first echelon may normally reach 1.5 to 2.0 or more units of fire. In effect, this means that there is no ammunition left either in the divisions or in the mobile artillery depots of the armies, and the troops cannot conduct further combat actions. But pursuant to the plan of the exercise, it is at this time that an abrupt operational transition is made, and the operation continues to develop at the planned rate. It is obvious that in an actual situation, the rate of advance of the troops would unavoidably decrease because of the shortage of ammunition, and it is even likely that any further advance would become impossible.

Very "original" grounds justifying a reduction in the expenditure of ammunition by the artillery in present-day operations are presented in the monograph "The Rear Services Support of the Front Troops During an Offensive Operation in the Initial Period of a War", published in 1961 by the Military Academy of Rear Services and Transportation. The following table is found on page 96 of this work.

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Table 1

Operation	Year Conducted	Army and <u>Front</u>	Average daily	
			Rate of advance (km/day)	Expenditure of ammunition (units of fire)
East Prussian	1945	5th Army 3rd BF*	6	0.2-0.25
	"	39th Army 3rd BF	8	0.18-0.2
Belorussian	1944	18th Army 1st BF	10	0.15-0.18
	"	65th Army 1st BF	12	0.12-0.15
	"	3rd Guards Army 1st BF	11	0.09-0.12
Lvov-Sandomir	1944	13th Army 1st UF**	17	0.03-0.05
Vistula-Oder	1945	13th Army 1st UF	18	0.03-0.05
	"	5th Shock Army 1st BF	23	0.08-0.09
Iasi-Kishinev	1944	37th Army 3rd UF	24	0.02-0.04
	"	27th & 82nd Armies 2nd UF	over 30	0.02-0.04
* Belorussian <u>Front</u> ** Ukrainian <u>Front</u>				

On the basis of this table, the conclusion is drawn that there is a natural decrease in the expenditure of ammunition as the rate of advance increases. Further, on page 94 it is stated: "In present-day operations, which are conducted at high rates exceeding twofold to threefold those of the World War II offensive, this natural decrease will become more marked."

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At first glance, the table appears to demonstrate that the higher the rate of advance of the troops is, the lower the expenditure of ammunition will be. However, a detailed examination of the data in the table quickly reveals that the examples furnished by the authors are given a one-sided analysis. This can be easily proven with respect to the 48th and 65th Armies of the First Belorussian Front during the Belorussian Operation of the year 1944.

The table indicates that the average rate of advance of these armies was 10 to 12 kilometers per day. It is not clear to which period of the Belorussian Operation this applies, but it is known that the average rate of advance of the troops of the First Belorussian Front, which included the 48th and 65th Armies, reached 22 to 25 kilometers per day during this operation, and in the center of the 48th Army on 3 July it reached 40 to 45 kilometers*.

These data differ sharply from those presented by the authors of the monograph.

It is known that the high rates of advance in the Belorussian Operation were achieved as the result of a powerful initial strike, which brought about the breaking up of the enemy into units. It was during this initial strike that the bulk of the ammunition was expended, and not during the course of the operation. Unfortunately, this is not reflected in the above table, although it was the 48th and 65th Armies that had to break through the best prepared defenses of the enemy.

Emphasizing the low expenditure of ammunition for artillery during the operation, the authors pass over in silence a number of important points.

First, the troops in the Belorussian Operation had a large amount of organic artillery, and were reinforced by a quantity of the artillery of the Reserve of the Supreme High Command that would now be out of the question. Thus, the 65th Army received as reinforcement six breakthrough artillery regiments, four corps artillery brigades, three gun artillery brigades, two super heavy artillery battalions, two guards mortar brigades, one tank destroyer artillery brigade, three guards mortar regiments, and other artillery units. With this quantity of artillery, the magnitude of a unit of fire and, consequently, the fire capabilities were several times greater than the magnitude of a unit of fire and the fire capabilities of

*Data from the work "The Destruction of the German-Fascist Forces in Belorussia in the Year 1944", published by the Academy of the General Staff, 1959, Volume 7, page 144.

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the artillery of an army in present-day operations.

During offensive operations of World War II, as a rule our artillery strength was three to four times greater than that of the enemy, and in breakthrough sectors it was as much as six times greater. It will be impossible to achieve such a degree of superiority in present-day operations.

The above facts demonstrate that the World War II ammunition expenditure norms for the front, army, and division are hardly applicable under present-day conditions. The experience of World War II can be used only with respect to the expenditure of ammunition in the performance of specific fire tasks by the artillery. Among such tasks may be: the destruction of enemy personnel and fire means under various conditions, the destruction of batteries, the destruction of structures, etc.

The authors of the monograph, whose conclusions are based on the low expenditure of ammunition during the operation, pass over in silence the fact that during the Belorussian Operation cited by them, and in other operations as well, because of the difficulty of delivering ammunition from the army (front) depots to the troops, the supplies actually available to the troops of the first echelon during the period of 17 to 26 July 1944 fluctuated on the average from 0.2 to 0.5 units of fire, and for specific types of ammunition dropped to zero. Rather than attribute the low expenditure of ammunition to the increased rate of advance, as do the authors, it would be more accurate to attribute it to the lack of ammunition among the troops. Moreover, it is obvious that the rate of advance would have been higher and the casualties lower if the troops had been able to expend more ammunition.

Typical in this respect is the example of the 105th Rifle Corps of the same 65th Army, which was forced to retreat from the Western Bug River on 26 July 1944 because it had almost completely run out of ammunition.

The above examples make it possible to conclude that the opinion of the authors of the monograph, that as the rate of the advance increases the expenditure of ammunition decreases, is mistaken. This principle can be applied only where the enemy is being pursued and is not offering significant resistance. In those cases where the enemy is retreating with stubborn fighting on intermediate lines, or where he is conducting a mobile defense, the reverse principle will apply: the more ammunition the troops, and, in particular, the artillery are able to expend, the higher the rates of advance will be.

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As a result of the lack of theoretically well-grounded approximate norms for the expenditure of artillery ammunition and erroneous conclusions such as those pointed out in the above-mentioned monograph, there has been a sharp reduction in the quantity of ammunition allocated during front exercises, as can be seen from Table 2.

Table 2

Site of Exercise	Time of Conduct	Expenditure of Ammunition, in <u>front</u> units of fire		
		for small arms	for ground artillery	for tanks
Belorussian Military District.....	June 1956	1.7	2.6	2.6
Military Academy of Rear Services and Transportation....	June 1958	1.5	2.8	2.2
"	January 1959	1.6	2.75	2.0
"	April 1959	1.4-2.5	1.5-3.0	1.8-3.4
"	February 1960	1-1.3	1.5-2.0	1.4-1.9
"	February 1961	0.6-0.7	1.2-1.3	1.5-1.6

As is obvious from the table, the amount of ammunition issued for an operation has declined year after year.

There is no doubt that as a result of the wide-scale employment of nuclear weapons, the expenditure of conventional ammunition is also changing, but in this regard we must take into consideration as a whole all

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the changes that have taken place in the organization of the troops and in the views on the conduct of an operation.

For example, the reduction in the organic divisional and army artillery and the sharp reduction in the artillery of the Reserve of the Supreme High Command has led to a threefold to fourfold decrease in the amount of artillery in a front.

Consequently, even if a front were issued the same amount of ammunition (in units of fire) as was issued in operations during World War II, the front would actually receive threefold to fourfold less ammunition.

We should also take into consideration the fact that the emergence of nuclear weapons has led to a twofold to threefold increase in the size of the offensive zones of divisions, armies, and a front, with a simultaneous increase in the depth of the tasks. Unfortunately, these changes are not usually taken into account.

Changes in the nature of the present-day battle are also not taken into account. Thus, until the emergence of nuclear weapons, troops advanced in a continuous front with the adjoining flanks. Basically, each subunit, unit, and even a majority of the large units, particularly during a breakthrough, had to destroy the enemy forward of the front. The flanks were secured by the fire of advancing adjacent troops. In a present-day battle, not only large units, but also units and frequently even subunits will advance on separate axes. The fire support for open flanks will require an additional expenditure of ammunition, primarily to destroy antitank guided missile units and artillery, especially artillery employing nuclear ammunition.

While in the past the infantry moved on foot on the battlefield when conducting an offensive, now, most of the time, the motorized infantry will fight from armored personnel carriers or combat vehicles. This significantly increases the fire capabilities of the motorized infantry, but it also results in a greater expenditure of ammunition.

In an offensive conducted without the employment of nuclear weapons, particularly in a breakthrough of the enemy defense, the battle disposition and operational disposition of the troops were distinguished by in-depth echeloning. Calculations show that if an army was allotted 0.15 to 0.2 units of fire for small arms for each day of combat, those subunits fighting in the first echelon could expend as much as 1.5 to 2.0 or more units of fire. In present-day operations the number of troops in the

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second echelons and in the reserves has been significantly reduced, and this factor must also be taken into account.

Before the emergence of nuclear weapons, when tank and mechanized units and large units conducted combat actions, the enemy directly in front of the attacking tanks and motorized infantry was hit constantly by a large quantity of artillery and aircraft. It is sufficient to recall that during the Berlin Operation, in the zone of the First Belorussian Front alone, 12,500 guns were in operation, and they expended 3,873 rail car loads of ammunition. Over a period of 17 days, the aviation in the zone of the First Belorussian Front performed 28,352 sorties to make strikes against enemy personnel and equipment. In addition, tank and mechanized units and large units had a large amount of organic artillery. For example, a tank corps had 182 guns and mortars, and a mechanized corps, 250 guns and mortars. For each tank on the offensive, there were allocated several guns and mortars for reinforcement. It is obvious that with such fire support, the expenditure of tank ammunition was limited.

During a present-day war, the tank units and large units will have to engage in combat actions under totally different conditions. It cannot be assumed that all enemy targets will be subjected to massed, continuous destruction by nuclear weapons. Moreover, in a number of cases the troops will conduct combat actions entirely without nuclear weapons or with their limited employment.

In addition, only a very limited amount of artillery and aircraft now can be allocated by the front and army for the support of combat actions conducted by tank units and large units. It is not to be ruled out that troops will operate on individual axes using on the whole only their own organic means. However, as is known, the tank regiments have no organic artillery and mortars at all and a tank division of four regiments has a total of four artillery battalions. It is obvious that under present-day conditions, tank subunits will be forced to perform a majority of the tasks aimed at the destruction of the enemy, including his antitank means, with the firepower of the tank guns and machineguns, which most likely will lead not to a decrease but to a significant increase in the expenditure of ammunition.

The above considerations confirm that the existing belief that the expenditure of conventional ammunition will be sharply reduced in operations conducted with the employment of nuclear weapons is mistaken.

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It is impossible to establish the actual amount of ammunition that will be needed for small arms and tanks on the basis of the experience of exercises conducted in recent years since this matter was not fully worked out. It is our opinion that special trial exercises must be conducted to obtain even approximate norms for the expenditure of ammunition under various battle conditions.

We will now attempt to determine the quantity of artillery ammunition required by a division, army, and front to perform tasks during a battle or an operation, allowing for the employment of nuclear weapons.

We recommend the following methodology for calculating the requirements for artillery ammunition, verified by the experience of preparing and conducting a number of divisional, army, and front exercises.

Using the 'Manual on the Control of Ground Artillery Fire', 1964, the factors for converting shells of any caliber to the equivalent number of 122mm shells required for the destruction of standard objectives (targets) can easily be determined. The fact that the conversion factors may change if the nature of the targets is changed should be taken into consideration.

Using the conversion factors, the number of 122mm shells that equal one unit of fire of all the mortars and artillery in a division, army, or front is easily calculated. For a motorized rifle (tank) division, depending on its organization, the unit of fire for artillery and mortars allocated for the performance of tasks from indirect firing positions, converted to 122mm shells, amounts to 6,480 to 8,300 shells.

If the composition of the army (front) is known, its unit of fire can easily be determined and converted to 122mm shells.

On the basis of an analysis of the operational plan for probable enemy actions, which tasks the artillery of a division of the first echelon should perform and where and when can be determined with sufficient accuracy for practical calculations. With this information, the number of shells it is anticipated will be expended to perform all tasks is determined. After the figures on the number of shells to be expended during the first day of the operation have been obtained for the immediate task and subsequent task of the army for each division, they are converted to division units of fire.

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The conversion to an army unit of fire, and when necessary to a front unit of fire, is accomplished by the usual method, with a calculation of the weight in tons of the units of fire of the army (front) and the divisions.

After analyzing the volume of tasks performed by the artillery of the divisions of the first echelon in an operation conducted with the employment of nuclear weapons, we came to the conclusion that in a majority of cases the divisions will require from 1.3 to 2.0 units of fire for artillery and mortars on the first day of combat.

A variant of the calculation of the quantity of ammunition required by a division for a day of combat, if its offensive zone to the depth of the task of the day is defended by up to 50 percent of the forces and means of a US Army infantry division, is presented in Table 3.

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Table 3

Designation of Targets (Objectives)	Total in the Zone of the Division			Norm for the expenditure of 122mm shells (number of shells)	Shells needed	
	Target (Objectives)	Number destroyed by nuclear weapons, aviation, and tanks	Number destroyed by artillery and mortar fire from indirect fire positions		122mm caliber (number of shells)	In units of fire for motorized rifle division
Infantry division and brigade command posts	2	2	-	-	-	-
Tank companies.....	3	3	-	-	-	-
Infantry companies.....	12	6	3 in trenches (18 hectares each) 3 without cover (18 hectares each)	150 per hectare 20 per hectare	8,100 1,080	- ..
Mortar platoons.....	4	2	2	55 per platoon	110	-
Antitank guided missile platoons.....	4	2	2	55 per platoon	110	-
Honest John battalions	1	1	-	-	-	-
203mm howitzer batteries	1	1	-	-	-	-
155mm howitzer batteries	2	1	1	220 per battery	220	-
105mm howitzer batteries	5	3	2	220 per battery	440	-
Reinforcement batteries	5	2	3	220 per battery	660	-
<u>Total in the zone of the division:</u>				10,720	about 1.5	

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Given the indicated average norms for the expenditure of ammunition during the first day of an operation, an army composed of five divisions, with four divisions in the first operational echelon, will require from 1.1 to 1.6 army units of fire for artillery and mortars.

During the succeeding days of the operation, the expenditure of ammunition by the divisions may change substantially, within the limits of 0.2 to 1.0 or more units of fire.

When divisions are compelled to break through enemy defenses in the operational depth, participate in the repelling of an enemy counterstrike, or engage in a meeting battle with the reserve divisions of the enemy, the expenditure of ammunition by them, according to the experience of exercises, will amount to 0.8 to 1.2 or more units of fire per day. The expenditure of ammunition for artillery and mortars by divisions engaged in a pursuit or repelling counterattacks of small enemy forces amounts to 0.2 to 0.5 units of fire.

According to the experience of exercises, during the first army operation of the initial period of a war, a combined-arms army will be forced to expend an average of about 0.3 units of fire of ammunition for artillery and mortars. The total expenditure for an army operation lasting six days may amount to 2.6 to 3.1 army units of fire, and the total expenditure for a front operation will be not less than 4.0 to 4.5 units of fire.

For operations conducted without the employment of nuclear weapons, the expenditure of ammunition will be substantially greater. Thus, the divisions of the first echelon may require 2.5 to 3.5 units of fire during the first day of the operation alone if as much as 50 percent of the forces and means of an enemy infantry division are in its zone. (This can be seen from Table 4.)

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Table 4

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Numerical order	Designation of Targets (Objectives)	Total in the Zone of the Division			Norm for the expenditure of 122mm shells (number of shells)	Shells needed	
		Targets (Objectives)	Number destroyed by aviation and tanks	Number destroyed by artillery and mortar fire from indirect fire positions		122mm caliber (number of shells)	In units of fire for motorized rifle division
1	Infantry division and brigade command post	2	1	1 (4 hectares)	150 per hectare	600	-
2	Tank companies.....	3	3	-	-	-	-
3	Infantry companies....	12	3	9 (6 in trenches, each 18 hectares 3 without cover, each 18 hectares)	150 per hectare 20 per hectare	16,200 1,080	-
4	Mortar platoons.....	4	2	2	55 per platoon	110	-
5	Antitank guided missile platoons.....	4	2	2	55 per platoon	110	-
6	Honest John battalions	1	1	-	-	-	-
7	203mm howitzer batteries	1	-	1	220	220	-
8	155mm howitzer batteries	2	-	2	220 each	440	-
9	105mm howitzer batteries	5	2	3	110 each (50% of norm)	330	-
10	Reinforcement batteries	5	2	3	110 each (50% of norm)	330	-

Total in the zone of the division:

19,420

about
2.5

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During the first day of an operation in the initial period of a war, a combined-arms army will expend 2.0 to 2.8 units of fire. On succeeding days an average of about 0.3 to 0.4 units of fire will be expended, and the total expenditure of artillery ammunition for an operation lasting six to seven days may amount to 3.5 to 5.2 army units of fire.

It is known that the mobile reserves of a motorized rifle (tank) division amount to a total of 1.0 unit of fire, while a mobile army artillery depot carries 0.25 units of fire. Comparing these data with the probable expenditure of ammunition it is easy to see that a division does not have enough ammunition for the first day of combat.

A strange and inexplicable situation arises. Divisions have mobile reserves with sufficient rations for 13 days of combat, or for an entire front operation; and enough fuel for five to six days, or for an army operation; but not enough mobile reserves of ammunition for artillery and mortars for one day of intensive combat.

An especially dangerous situation may develop in the first two to three days when the expenditure of ammunition by each division of the first echelon may be up to 2.0 units of fire on the first day and as much as 1.0 to 1.5 units of fire on the succeeding two days because of the necessity of breaking through the enemy defense, conducting a meeting engagement, and repelling the counterattacks of the immediate operational reserves.

During World War II, a way out of a similar situation was found by setting up, right at the firing positions, ammunition reserves for the period of preparatory fire, and sometimes for support of the attack. From 1.5 to 2.0 units of fire were laid out on the ground. However, at that time the breakthrough was prepared under conditions of direct contact with the enemy, and the rate of advance, particularly during the first day of an operation, was fivefold to tenfold less than that of present-day operations.

The majority of large units now go over to the offensive from permanent deployment points or concentration areas located far from the border. The probable enemy is preparing powerful defensive lines in the depth. In the first day of a war, divisions can count on only the ammunition they take with them from the permanent deployment points, that is, 1.0 unit of fire, which is clearly insufficient.

It is difficult to count on success with such mobile reserves. The situation is further complicated by the fact that an army also has little

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ammunition -- 0.25 units of fire in all, which cannot cover the expenditure of even the first day of the operation.

From the foregoing we cannot but conclude that mobile reserves of ammunition for artillery and mortars in the division and in the mobile army artillery depot must be increased. Otherwise, the army artillery may be without ammunition by the end of the first or second day of the operation, and by this time the distance from the front ammunition depots may be 200 to 250 kilometers.

It is known from the experience of World War II that during an operation, the expenditure of ammunition in units of fire by long-range systems is 1.5 to two times greater than by 76mm guns and mortars. Because present-day operations are mobile in nature and because of the emergence of enemy artillery employing nuclear warheads, there will be an even greater difference between the ammunition requirements of long-range systems and the ammunition requirements of battalion and regimental artillery and mortars. It can therefore be concluded that the mobile reserves for the rocket artillery and the long-range artillery systems should be the first to be increased.

Obviously, mobile reserves for the artillery and mortars of motorized rifle (tank) divisions should be increased to a minimum of 1.25 units of fire, and those of separate artillery units and large units -- to 1.5 units of fire. In addition, the reserves of the mobile army artillery depot should be increased to 0.5 army units of fire. Only then will the armies of the first echelon be able to carry out intensive combat actions with available reserves for a period of four to five days.

As a temporary measure to increase the combat readiness of the troops, it may be found advantageous to create, using the forces and means of divisions of the first echelon, small depots (with 0.25 to 0.5 units of fire) close to the state border on the most probable axis of their operations.

In theaters with a well-developed rail network, such reserves could be set up and maintained right in railroad cars, and delivered to the troops during an operation over one of the surviving or restored branch lines.

In conclusion, it should be noted that in recent years, measures aimed at increasing the mobility of the troops have been accomplished largely by reducing the amount of the artillery and the transport allocated to ammunition. Obviously, the time has again come to investigate this

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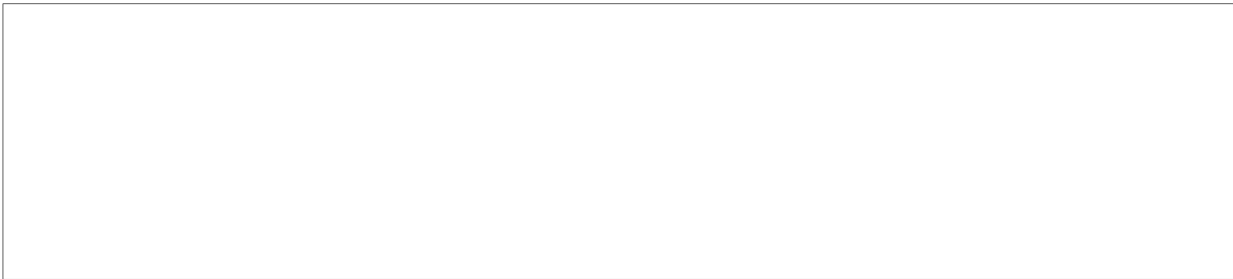
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question in order to establish more reliable conditions for supplying the troops with the ammunition needed to carry out intensive operations.

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